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MAMMALS OF THE OREGON CAVES AREA, JOSEPHINE COUNTY

BY ARYAN I. ROEST

Apparently little work has been done on the mammalian life of the Siskiyou Mountains. Anderson and Grinnell (1903), Grinnell (1916), Kellogg (1916), and Mailliard (1921, 1923*a*, 1923*b*) have worked with both mammals and birds in the California Siskiyou, but the Oregon Siskiyou have remained untouched except for sporadic collecting. This is somewhat surprising, since it is in the Siskiyou that many boreal and austral forms, as well as animals from the coast ranges and the Cascade-Sierra Nevadas, are found together.

This report is the condensed result of field work in the vicinity of the Oregon Caves National Monument, a more complete discussion having been presented in a master's thesis at Oregon State College. The encouragement and advice of Dr. Kenneth L. Gordon are gratefully acknowledged. The assistance of Mr. Richard Rowley, a resident of the area since 1907, was of great value in this study, and Mr. Florenz Breitmayer, Jr., an employee of the Oregon Caves Company, also contributed useful information.

The area studied covered about four square miles in and around the national monument. Time in the field totalled about ninety days, in March, 1948, and from June to September, 1948.

The National Monument comprises an area of 480 acres, and is surrounded on all sides by the Oregon Caves State Game Refuge, in the Siskiyou National Forest. It is about twenty-four miles nearly due south of Grants Pass, Oregon, and about six miles north of the state line, in Josephine County.

The Siskiyou Mountains are the remains of an ancient, deeply dissected peneplain, resulting in a fairly level profile of ridgetops, separated by numerous steep-sided ravines or canyons. The caves are located at an elevation of 4000 feet, with two entrances opening on the north slope of a ridge running roughly east-west. This is known as Sand Ridge. East of the monument, along Sand Ridge, are three summits known as Mt. Elijah (6636 ft.), Lake Mountain (6663 ft.), and the Lookout (6636 ft.). These peaks form the southern perimeter of a small lake basin, containing Upper and Lower Biglow lakes. Both lakes are drained by Lake Creek, which runs northwestward and is separated from Cave Creek by a minor spur from Sand Ridge. Cave Creek, as its name indicates, has its source within the cave, and flows from the lower or main entrance. Lake and Cave creeks eventually join, continuing as Cave Creek to the Illinois River, which in turn empties into the Rogue River.

At the cave entrance are a group of buildings, including a hotel, gift shop, cabins, employees quarters, and a parking area, comprising the Oregon Caves Resort. A garbage dump is located about a mile north of the resort area, where the highway crosses Lake Creek.

Originally the caves had only two entrances near each other. Some years ago, however, a tunnel was blasted through 700 feet of marble to form the present exit, and a quarter mile exit trail leads back to the resort.

The weather at the caves is hot and dry during the summer months. In winter

the area is covered with snow which may reach a depth of six feet during a severe winter, but averages about three feet.

From approximately 2000 to 5500 feet elevation the vegetation is primarily an old Douglas fir (*Pseudotsuga taxifolia*) forest. In some areas seepages in the steep slopes provide sufficient moisture for small meadowlike areas. Such meadows include the Glade, above the caves on Sand Ridge, and the area around the Big Tree, a Douglas fir twelve and one-half feet in diameter, about a half mile east of the caves. Along the small streams, western yew (*Taxus brevifolia*), Port Orford cedar (*Chamaecyparis Lawsoniana*), and Oregon maple (*Acer macrophyllum*) are found in association with the Douglas fir, while on the drier, southerly-exposed slopes, yellow pine (*Pinus ponderosa*), tanbark oak (*Lithocarpus densiflora*), chinquapin (*Castanopsis chrysophylla*), and madrone (*Arbutus Menziesii*) are found with the commoner fir. Underbrush is scarce, and in the pure fir forest the ground is practically bare of living plants. A shrub layer, where present, is usually found in more open areas, and may be represented by a typical chaparral growth where the soil is thin, as over subsurface rocks.

Above an elevation of about 5500 feet, the dominant Douglas fir is replaced by mountain hemlock (*Tsuga Mertensiana*), with white-bark pine (*Pinus albicaulis*) and white fir (*Abies concolor*) as the associated species. Around the lakes are large herbaceous meadow areas. The ridges, especially their southern exposures, are dry and rocky, and support a low chaparral growth.

Because it is illegal to collect specimens in a national monument, most work was done by direct observation. Some specimens were taken, either from outside the monument or as animals killed within it by accident. Identification is consequently to species only, except in such fairly obvious cases as the blacktail deer. All specimens taken are now in the Oregon State College Museum of Natural History, unless otherwise indicated. Plant identification follows Peck (1941).

ACCOUNTS OF SPECIES

Sorex vagrans Baird. Vagrant shrew.—Two male shrews of this species were taken during the summer, July 9 and 27, 1948. Both came from open or forest areas, near rock outcrops, on north to northwest-facing slopes.

Myotis yumanensis (H. Allen). Yuma bat.—Two male specimens were obtained on August 12 and 20, 1948, respectively. The first came from the basement of the hotel, the second from the exit tunnel.

Myotis evotis (H. Allen). Big-eared bat.—A male of this species was killed July 2, 1948, in the hotel dining room.

Myotis thysanodes Miller. Fringe-tailed bat.—A male with testes descended was caught in the exit tunnel September 4, 1948. This specimen has been sent to Dr. Seth Benson, at the University of California. There are only two previous records of this species from Oregon, to my knowledge, both taken in Tillamook County by Mr. Alex Walker, on September 13, 1928, and August 3, 1940.

Corynorhinus rafinesquii (Lesson). Long-eared bat.—On August 26, 1948, a male with testes descended was killed in the basement of the hotel.

Lasionycteris noctivagans (Le Conte). Silver-haired bat.—Jewett (1926) reports that this species was abundant at the caves, but no sign of it was found in 1948.

Ursus americanus Pallas. Black bear.—Bears were seen throughout the summer, especially at the garbage dump. Both black and brown phases were observed in a ratio of about

3:2. Although seen only in the timber, tracks showed that they also traveled the ridge-tops.

Bassariscus astutus raptor (Baird). Ring-tailed cat.—Although absent in recent years, Mr. Rowley reported that these animals had occurred in the resort area in the past, and that he had tamed three of them one winter.

Martes caurina Merriam. Marten.—Forest Service reports indicate that martens are fairly abundant, but Mr. Rowley stated that they were not common, although still present in the higher parts of the mountains.

Martes pennanti (Erxleben). Fisher.—The 1939 Forest Service report states that this species is either very rare or no longer occurs here.

Mustela frenata Lichtenstein. Long-tailed weasel.—Weasels have been seen occasionally in the vicinity of the resort, according to Mr. Breitmayer.

Mustela vison Schreber. Mink.—Mr. Rowley reported that mink were formerly trapped in small numbers along the streams.

Spilogale gracilis Merriam. Spotted skunk.—In early June a spotted skunk was seen near the steps of the gift shop. Another (or the same one) was noted in a woodpile in the hotel basement during July.

Vulpes fulva (Desmarest). Red fox.—Mr. Rowley says red foxes occur in the area, but are not common. Walling (1884) reported that silver foxes were occasionally trapped in the Siskiyou.

Canis latrans Say. Coyote.—Several times during the summer the night clerk in the hotel saw coyotes around the garbage cans at the kitchen entrance. Two were seen on September 9, 1948, at 3:30 A.M. Tracks and droppings were frequently seen along Sand Ridge. According to the Forest Service report for 1945, coyotes killed a beaver at Upper Biglow Lake in that year. Steel (1890) reported hearing a coyote at the caves in 1888.

Canis lupus fuscus Richardson. Wolf.—According to Mr. Rowley, a pack of about nine wolves roamed the area between 1910 and 1915. To his knowledge, the last wolves seen were a pack of seven, observed crossing the road near Williams by Dr. Loughridge of Grants Pass, in 1923. In the Oregon State Game Commission Biennial reports, one wolf was turned in for bounty payments in Jackson County, adjacent to the east, almost every year from 1920 to 1932. In the 1933–1934 period, twelve were reported bountied, but none since that date. Wolves were reported seen in the high Siskiyou by foresters or cattlemen in the 1934, 1937, and 1938 Forest Service reports.

Felis concolor True. Mountain lion.—A lion was seen crossing the highway a few miles below the caves three times during 1948. These animals are often hunted with dogs by local residents.

Lynx rufus Schreber. Bobcat.—Fresh bobcat tracks were seen in the snow near the resort in January and December, 1948, by Mr. Breitmayer. The form in the caves area may be an intergrade between *californicus* and *fasciatus*.

Citellus beecheyi douglasi (Richardson). Beechey ground squirrel.—Several “graydiggers” maintain themselves in the resort area by begging for peanuts. They occur also along the highway, but nowhere else.

Citellus lateralis trinitatis (Merriam). Mantled ground squirrel.—This species was observed in the resort area, at the garbage dump, and along the slopes and ridge just south of Upper Biglow Lake. Two males and a female were picked up as fresh road kills from the parking area on June 21, July 1, and August 23, 1948, respectively. The female had very thin fur, pale in color. Young animals were first observed on July 13.

Eutamias amoenus ochraceus Howell. Yellow pine chipmunk.—A male and a female were collected August 13, 1948, from the ridge near Mt. Elijah. The male was in the bright summer pelage, but the female was still in the gray winter fur. Her nipples indicated recent nursing.

Eutamias townsendi siskiyou Howell. Townsend chipmunk.—Observed throughout the Douglas fir forest, and at the resort. A female collected August 19, 1948, showed evidence of recent nursing.

Tamiasciurus douglasi Bachman. Chickaree.—Seen and heard throughout the Douglas fir. An adult male collected August 4, 1948, at the garbage dump showed the beginning of a molt at the shoulders. Some of those seen had white undersides, some yellowish or orange, apparently indicating an intergrading form.

On June 21, two were observed in a courtship chase, running spirally around a small fir trunk for several minutes. Finally the female stopped, clinging to the tree with head pointed upward. The male then mounted from below, dog fashion, holding tightly to her and not to the tree.

One individual, which ranged in the trees near the hotel, was twice observed to chase after young mantled ground squirrels on the ground, catch them, and kill them by rolling them over and over, biting at throat and head.

Sciurus griseus Ord. Western gray squirrel.—This form occasionally wanders up to the caves from the valley. Two were seen at the parking area in July.

Glaucomys sabrinus Shaw. Flying squirrel.—On August 6, 1948, a tourist brought in the terminal two-thirds of the tail of a flying squirrel which had been found on a trail near the Big Tree.

Castor canadensis Kuhl. Beaver.—The Forest Service planted eight beaver in Upper Biglow Lake in 1935. The colony still exists, but has not spread, apparently due to unfavorable food conditions in the surrounding country. The population is now estimated at about twenty individuals, and they have constructed one large lodge, two small dams, and several bank houses. Food now includes manzanita twigs and water lily stalks. The willows which formerly grew along the lake shore have been practically exterminated.

Peromyscus maniculatus (Wagner). White-footed mouse.—A very common species about the resort and in the surrounding forest, being found up to the summit of Lake Mountain. Judging from published range maps, the form at the cave is probably an intergrade between *gambeli* and *rubidus*. Mice are frequently seen inside the cave, but if resident there, the only food available to them would be the candy wrappers dropped by the tourists. Three specimens were taken through the summer. On July 15, 1948, two young mice, furred, but with eyes still closed, were found on the road in front of the hotel.

Neotoma fuscipes fuscipes (Baird). Dusky-footed woodrat.—A young female was caught August 15, 1948, in the gift shop. Others were often seen and heard in all the resort buildings. Nests of rats were found in the attic of the guide's quarters, between the ceiling beams. They resembled bird nests in that they were built of leaves and sticks, and each had a shallow depression six inches in diameter, lined with grass.

Neotoma cinerea occidentalis (Baird). Bushy-tailed woodrat.—One specimen, a male, was collected September 14, 1948, at the edge of a small stream west of the resort area. Another was seen running along a steam pipe in the hotel basement.

Phenacomys longicaudus True. Red tree mouse.—A juvenile male was killed in the guide's quarters August 17, 1948. A few white hairs were present at the tip of the tail.

Clethrionomys californicus (Merriam). Red-backed mouse.—On August 6, 1948, an adult of this species was seen in bright sunlight as it carried a hairless young across the trail from the cave exit, holding it by the abdomen, its feet pointing upward. The adult was observed from about six feet away, and the dark gray coloration and reddish back were readily seen for several seconds.

Ondatra zibethica (Linnaeus). Muskrat.—On October 15, 1948, Mr. Breitmayer killed a muskrat in the small pool just outside the hotel. It was probably a wanderer from the valley, where this species has been introduced.

Apodontia rufa (Rafinesque). Mountain beaver.—Burrows of mountain beaver were found at the Glade, the Big Tree, and in the ravine above the resort. A half-grown specimen was found in the Ghost Chamber of the cave, 800 feet from the nearest known opening. It had been dead for several days and mice had chewed parts of it, but the skull was saved.

Zapus trinotatus Rhoads. Jumping mouse.—Mice of this species were seen three times, twice in the employee's quarters and once along Cave Creek below the hotel.

Erethizon dorsatum (Linnaeus). Porcupine.—A porcupine was seen early in June along

a trail west of the resort. Various reports indicate that the porcupine occurs, but is never common.

Lepus americanus Erxleben. Snowshoe Hare.—Hares were seen several times during the summer at the cave exit, under the cabins above the gift shop, and along the trail above the guide's quarters.

Sylvilagus bachmani (Waterhouse). Brush rabbit.—On July 3, 1948, a small dark rabbit, probably of this species, was seen in a madrone and rhododendron thicket above the parking area.

Cervus canadensis roosevelti Merriam. Roosevelt elk.—Walling (1884) says that in earlier days elk were common in the Siskiyou, but by 1884 had been much reduced and confined to the more inaccessible parts of the mountains. At present they are restricted more to the coast, but Forest Service reports indicate they occasionally drift inland.

Odocoileus hemionus columbianus (Richardson). Blacktail deer.—The Forest Service feels this area is one of the best in the Siskiyou National Forest for deer, and they are seen fairly commonly at all elevations. The largest single group, composed of nine deer, was seen March 18, 1948, behind the hotel. One old buck, identified by a slit ear, has visited the resort area for at least thirteen years.

DISCUSSION

As has been pointed out in the introductory paragraph, the Siskiyou Mountains are a region where representatives from several faunal areas mingle. In order to facilitate a study of this mixture in the area covered, it must first be broken down into its component parts. As a guide in such an analysis, which appears below, the examples of Merriam (1892) and Gordon (1947) have been followed.

Thirty-nine species have been mentioned as occurring at the caves, but only thirty-two can be considered in this analysis. The five bats are here disregarded due to insufficient knowledge of their ranges or habitat requirements. Beaver and muskrat are both introduced species, and hence must be discarded for this analysis.

Boreal and austral elements are both noticeably present at the caves. In addition, it is clear that three areas have been the immediate sources of much of the fauna. These are the coast ranges, the Cascade-Sierra Nevada system, and the California valley. Three forms may be considered endemic, at least sub-specifically. A fifth group is composed of wide ranging forms whose immediate origins cannot be traced. The tropical element is represented by the porcupine, having as its immediate origin the Cascade-Sierra Nevadas. This analysis is outlined below.

Coast Range (15.6 per cent).

Boreal element: *Sorex*, *Mustela frenata*, *Phenacomys*, *Cervus*.

Austral element: *Odocoileus*.

Cascade-Sierra Nevada (28.1 per cent).

Boreal element: *Martes caurina*, *Martes pennanti*, *Vulpes*, *Tamiasciurus*, *Glaucomys*, *Clethrionomys*, *Aplodontia*, *Zapus*, *Lepus*.

Austral element: (none).

Tropical element: *Erethizon*.

California valley (15.6 per cent).

Boreal element: (none).

Austral element: *Bassariscus*, *Citellus beecheyi*, *Sciurus*, *Neotoma fuscipes*, *Sylvilagus*.

Endemic (subspecies level) (9.4 per cent).

Boreal element: *Eutamias amoenus*, *Eutamias townsendi*.

Austral element: *Citellus lateralis*.

Undetermined origin (28.1 per cent).

Boreal element: *Ursus*, *Mustela vison*, *Canis latrans*, *Canis lupus*, *Felis*, *Lynx*.

Austral element: *Spilogale*, *Peromyscus*, *Neotoma cinerea*.

Totals.

Boreal element: 65.5 per cent.

Austral element: 31.3 per cent.

Tropical element: 3.1 per cent.

As can be seen, the mammals at the caves are largely boreal in origin, and the Cascade-Sierra Nevada system has been the immediate source of most forms. Strong elements from both the coast ranges and the California valley are present, however. This mixture of elements is no doubt due to the variety of habitats available in the caves area, including mature forest, moist streamside forest, meadow areas, and dry chaparral. The interconnecting system of mountain ranges forming the Klamath mountain system has played an important part in providing travel routes for montane forms.

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GENERAL NOTES

A NEW JUMPING MOUSE FROM THE UPPER PLIOCENE OF KANSAS

The University of Michigan Museum of Paleontology field party spent the month of July, 1950, working an Upper Pliocene deposit in Meade County, Kansas. The party consisted of Thomas M. Oelrich, Dwight W. Taylor, James Rogers, Thomas Sparrow, and Claude W. Hibbard.

Among the material recovered is the right ramus of a jumping mouse. This is the first record of the family Zapodidae from the Upper Pliocene of North America. It adds another mammal to the well-known Rexroad fauna. The ramus differs from that of other known species of *Zapus*.

Zapus rinkeri sp. nov.

Holotype.—No. 27036, University of Michigan, Museum of Paleontology, right ramus bearing M_1 - M_3 , adult. Collected in the summer of 1950 by the University of Michigan Museum of Paleontology, field party.

Horizon and type locality.—Upper Pliocene, Rexroad formation, Rexroad fauna. Locality UM-K1-47, Fox Canyon, sec. 35, T. 34S, R. 30W, XI Ranch, Meade County, Kansas.

Diagnosis.—A jumping mouse with a more massive ramus and a larger M_3 than is found in Recent species of *Zapus*. The external reentrant valleys of the teeth are broader and not as constricted as in the Recent forms of *Zapus*.

Description of holotype.—The holotype is a right ramus of a middle-age adult (Fig. 1b and c). The tip of the incisor and the ascending ramus are missing. The entire ramus is more massive than in any known Recent form. The diastemal region is flattened and broad transversely. Therefore, the mental foramen appears to rest more nearly on the dorsal surface of the diastemal region than on the labial side of the ramus. The incisor has a greater transverse width than in the Recent forms, and is extended well into the ascending ramus.

The anteroposterior length of the occlusal surface of M_1 - M_3 is 4.3 mm. This tooth-row length was observed in *Zapus princeps* Allen and *Zapus trinotatus* Rhoads. *Zapus rinkeri* is distinguished by the greater transverse width of M_1 and the broad and shallow external reentrant valley of M_1 and M_2 . The M_1 of *Zapus rinkeri* has the same occlusal length as M_2 . The anterior part of M_1 is nearly as wide as the posterior part. The teeth do not seem to be shorter crowned than the teeth of Recent forms. The internal reentrant enamel valleys do not extend as deep vertically into the side of the crown of the teeth as they do in the teeth of Recent forms of *Zapus*. M_2 possesses a greater anterotransverse width and a broader external reentrant valley than in Recent forms. M_3 has a greater anteroposterior length than that tooth in the Recent species of *Zapus*. The external reentrant valley is broad but shallow.

The occlusal enamel pattern of the teeth can be approximately duplicated in a series of Recent *Zapus*.

The species is named for the late Dr. Glen Clark Rinker of Hamilton, Kansas, who has contributed to our knowledge of Recent vertebrates for the past 50 years and who was a member, a number of times, of the University of Kansas paleontological field parties.